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FEDERAL RESERVE BANK
OF KANSAS CITY

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Money Supply and Velocity

MOST OF US ENGAGE in money transactions every day in the process of trading the goods and services we have to offer for the goods and services we wish to acquire. Yet we seldom consider the nature of money and its highly special characteristics. What distinguishes money from other things? How is the quantity of money related to its turnover? How are changes in money stock and velocity related to changes in expectations and income in the economy? Such questions relate to one of the basic elements of our economic system and its influence on the level of economic activity. This article is intended to serve as an introductory examination of these questions, as well as a review of recent changes in the quantity and velocity of money.

Money Supply in the United States

Generally speaking, the money supply in the United States may be regarded as the total means of payment possessed by the public. In this sense, it is an index of balances readily available for spending. Differing opinions have been presented regarding the inclusiveness of the concept of spendable balances, and without question, various definitions are appropriate to particular uses. For the present purpose — an examination of funds used for transactions—the money supply will be defined to include total coin, currency, and demand (checking) deposits held by individuals, business firms, and state and local governments. Composition of the money supply as thus defined is presented in the accompanying table.

This table reveals a number of important characteristics of our money supply. First, all of our money is credit money, rather than what might be termed "full-bodied" money. That is, all of our money represents some kind of liability of the issuer, rather than a commodity or warehouse receipts for a commodity, whose value in nonmonetary uses is as great as its value as money. Second, deposit money comprises nearly 80 per cent of the money supply, and it is estimated that about 90 per cent of all payments are made by check. Currency comprises only about 20 per cent of the money supply and coin less than 2 per cent. Third, the banking system—commercial banks and Federal Reserve banks—supply more than 95 per cent of our money.

In measuring the size of the money stock, it is necessary to recognize that all demand de-

MONEY SUPPLY
August 1956

Kind of Money	Amount (In billions)	Per Cent of Total
Treasury issues		
Coins	$ 1.7	1.3
Silver certificates	2.1	1.6
Other Treasury issues	0.4	0.3
Federal Reserve issues		
Federal Reserve notes	26.1	19.7
Total Currency and Coin	$ 30.3	
Less estimated vault cash of banks	—2.3	
	$ 28.0	
Demand deposits adjusted at commercial banks	104.5	78.9
Total money	$132.5	

SOURCE: *Federal Reserve Bulletin.*
Note: Percentage components do not add to 100 because elements of vault cash are included in outstanding currency and coin.

posits and currency in existence may not constitute balances available to the public for spending. Demand deposits owed to other commercial banks—interbank deposits—which amounted to about $13 billion on a recent reporting date, do not represent money as the term is used in this discussion. These bankers' balances are not available to the public for spending on goods and services, but instead are used within the banking system in the collection of out-of-town checks and as a liquid reserve of the owning bank.

A further deduction is made from total deposits equal to the amount of checks in process of collection. The purpose of this adjustment is to avoid counting the same balances twice, once in the bank which has just received and recorded the transferred deposit and once in the bank on which the check or draft is drawn.

Treasury balances present a different problem. These funds, which frequently exceed $5 billion, may be excluded from the money supply measure for two related reasons. Where the purpose of the measurement is chiefly to weigh the effect of changes in money holdings on private spending, Treasury balances obviously are irrelevant. Even where interest is not limited to private spending, Treasury balances may be excluded on the assumption that the size of these holdings has negligible influence on Government spending. The taxing and borrowing power of the Federal Government is such that current cash holdings are not a consideration in expenditure decisions.

Finally, currency held in bank vaults—approximately $2 billion—is excluded because such funds are not held by the public and, therefore, do not constitute immediate spending power.

Other Liquid Assets

While demand deposits and currency are easily recognized as belonging in the category of money, there are other assets whose characteristics may merit their inclusion in the money supply. Time and savings deposits at commercial and mutual savings banks, shares in savings and loan associations, and U. S. savings bonds clearly possess a high degree of liquidity—that is, their value remains stable in terms of money. Although banks are not legally required to pay such deposits on demand, in practice depositors generally are able to withdraw such funds on demand. In fact, therefore, by serving as a store of value, these assets do perform a very important function of money. There are still other classes of assets which display considerable constancy of value in terms of money and represent funds almost as readily available as currency and demand deposits. Short-term marketable Treasury securities and high-grade commercial paper fall into this category. All assets of these types have a high degree of moneyness and are factors in the spending calculations of the public. The availability of such funds in near-money forms is important from the standpoint of its effect upon economic developments.

Nevertheless, these liquid assets are not generally used as a transactions medium and therefore may, as in this discussion, be excluded from the money supply proper. Unlike currency and demand deposits, these assets are used for payments only after transformation into currency or checking accounts. While they may affect the rate of spending, other elements of wealth—nonliquid as well as liquid—also bear upon expectations and expenditure decisions. In fact, all assets possess some degree of liquidity, and therefore any dividing line between money and other things is somewhat arbitrary.

Velocity—The Rate of Turnover of Dollars

The relationship between changes in the quantity of money and spending on goods and services has been widely emphasized in ac-

counts of recent monetary developments, but considerably less attention has been given velocity, or turnover rate, a second important characteristic of money. Statistics on money supply reveal only the quantity of money balances held. They tell nothing of changes in money activity. Velocity, on the other hand, measures the intensity of use of the monetary stock and, in conjunction with changes in that stock, provides an important gauge of economic activity.

No complete and accurate data on the rate of use of the total money supply are available, due to the impracticality of determining frequency of use of the currency and coin component. The rate of use of demand deposits, however, though presenting certain technical difficulties, can be traced through bank records of deposit activity. Frequency of use of deposits is measured by the amount of checks written against them, the record of which is designated "debits to deposit accounts." The velocity or turnover rate is calculated by dividing the total of debits by the average volume of deposits outstanding during the period in question.

The total quantity of money, regardless of its magnitude, manifestly must be held by someone. These holdings of money reflect a demand for this type of asset, just as holdings of other economic goods reflect their respective demands. Consideration of the nature of motives for holding money may clarify the observed behavior of velocity. Quite evidently, a large part of the demand for money balances to hold arises from the need to finance current expenditures on consumption or production. Further, however, households and businesses normally desire to hold at least a little more than the absolute minimum required to meet payrolls, taxes, and the variety of other day-to-day liabilities. Additional balances serve as a cushion against unforeseeable needs, advantageous investment opportunities, and so forth. While it would be difficult to actually sort total money holdings between those balances held to meet current expenditures and those held for other uses, the distinction is useful for analytical purposes.

Given the level of gross national product—the dollar value of all current production—the amount of money needed to carry out the associated volume of transactions is fairly well determined. Technical and institutional factors, such as the frequency and regularity of receipts and disbursements, their correspondence in time and amount, and even the speed with which money is transported, establish the minimum volume of funds needed for current transactions. These factors are relatively stable, moreover, and set a kind of turnover ceiling. While these technical factors may change secularly, they are unlikely to produce short-run variations in velocity measures.

Actually, velocity never reaches this technical ceiling and seldom displays a highly stable behavior. Instead, it moves through rather wide variations from period to period at levels well below the technical maximum. Motives other than the need for transactions balances appear to be the variables which hold velocity below the ceiling and which are responsible for the short-run changes in velocity. These latter motives for holding cash are influenced by continually shifting expectations regarding price levels, interest rates, and profits. The development of bullish business sentiment and more favorable profit anticipations, for instance, might tend to generate higher investment spending. In the absence of a corresponding increase in the total money supply, the higher level of spending would have to be financed by drawing on previously idle balances, namely, those cash balances which were in existence but not already employed for transactions purposes. Such activation of balances would be reflected in an increase in the average velocity of the total

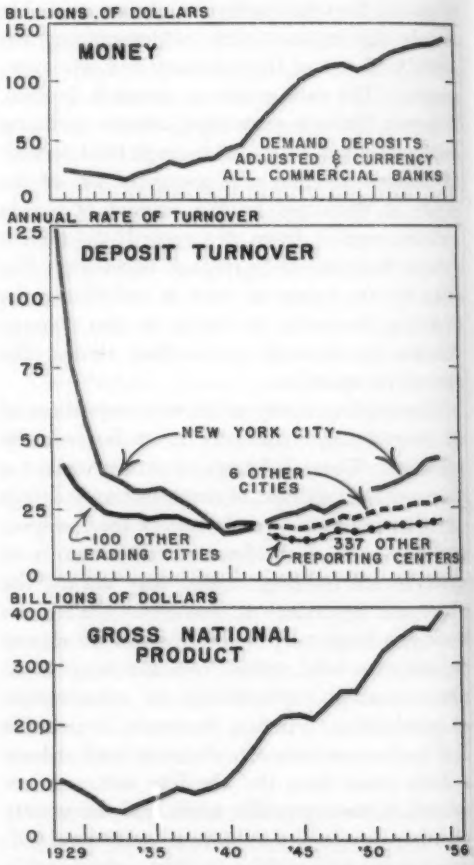
money stock. This process might also involve shifts in ownership, inasmuch as the holder of the balance would not necessarily be the prospective investor. This process of shifting balances from one holder to another might be accomplished through any of several channels—commercial banks, insurance companies, security dealers, or other, and would involve the exchange of nonmoney assets for cash. Conversely, an event interpreted as unfavorable to consumers and business might tend to inhibit spending and encourage the building up of nontransactions balances. This effort, if successful, would presumably be reflected in a lower level of production, income, and money turnover.

Review of Changes in Money Turnover

A review of changes in the money supply, gross national product, and velocity for the past 25 years reveals the extent to which the relationship between these measures has varied. The changing total demand for money in relation to transactions needs is pointed up through observation of velocity changes between periods of prosperity and periods of recession. The importance of changes in velocity may be underscored by reference to periods in which higher or lower spending rates were accomplished, not through corresponding changes in the actual volume of money, but by increases or decreases in turnover rate causing changes in the effective volume of money. In this sense, changes in velocity are the equivalent of changes in quantity of money. Therefore, it may be useful to study the relationship between money and production during periods in which monetary policy varied from ease to tightness.

The accompanying charts show that the volume of money in use dropped sharply from 1929 to the early thirties, as the economy entered a period of deep depression. By 1933, the quantity of money was approximately 25 per cent less than in 1929, but the rate of use of money dropped 45 per cent from its 1929 level. Between 1933 and 1937, gross national product increased approximately 60 per cent, but velocity did not follow this trend of output. Deposits expanded substantially during the middle thirties, both from the heavy inflow of gold and as a result of Government

MONEY SUPPLY, VELOCITY, AND GROSS NATIONAL PRODUCT
1929-55



SOURCE: Board of Governors of the Federal Reserve System and U. S. Department of Commerce.

deficit financing through the banking system. This expansion in volume of money was sufficient to meet requirements for current transactions and, in consequence, velocity was stable in the period 1933-36. During the brief recession which began in the third quarter of 1937 and continued through the second quarter of 1938, production and debits volume shrank abruptly. The volume of money, however, did not show appreciable movement, and its velocity necessarily fell further.

Even during the World War II defense build-up, velocity tended to decline, although in 1941 a brief upturn accompanied the 25 per cent rise in GNP. In the ensuing war years, output and debits continued to grow, although at a reduced rate after the economy reached capacity production levels. Deposit turnover outside New York City persistently declined in this period, however.

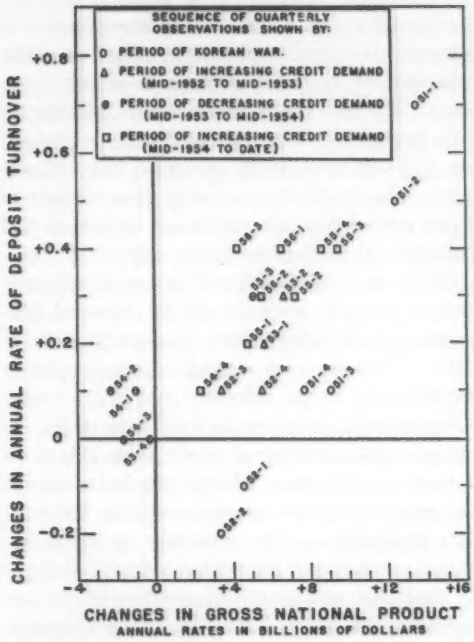
The lowered rate of turnover during the war was brought about by continuing expansion of the money supply, together with direct controls over the volume of civilian spending. From the end of 1941 to the end of 1945, the money supply more than doubled as the Treasury resorted to borrowing from commercial banks, although GNP increased by only 70 per cent. In addition, the large volume of Government purchases (averaging about 40 per cent of GNP) in these years tended to diminish the number of intermediate transactions normally accompanying the production and marketing process.

In the postwar decade, the general trend of velocity has been upward. Beginning in 1946, the annual measure of deposit turnover increased from around 14 to nearly 21 in 1955, an increase of 50 per cent. More recently, deposits have reached an annual turnover rate of 22. This gain is considerably greater than the increase in quantity of money, and points up the fact that the over-all change in velocity has been a very large factor in the growth of spending in the postwar period. From 1946 through 1949, the quantity of money, as measured by privately held demand deposits and currency, was not an important factor of change in total spending. The quantity changed by only $1.1 billion, or about 1 per cent. The rise in production and spending in this period was accomplished mainly through an increase in velocity of more than 12 per cent. The increase in velocity is estimated to have added the equivalent of well over $10 billion to the effective money supply.

With the onset of hostilities in Korea, the money supply moved rapidly upward, increasing $4.6 billion from June 1950 to June 1951. Velocity also surged upward, adding significantly to the effective supply of money. Undoubtedly, the prospect of both price increases and shortages of goods led to this more intensive utilization of existing balances, as households and businesses sought to accumulate inventories. The increases in gross national product and associated velocity changes in that year and in the succeeding five years are recorded in the following scatter diagram. The observations recorded there represent quarterly changes in GNP, seasonally adjusted, together with accompanying changes in velocity. The velocity measurement represents quarterly changes in demand deposit turnover at 344 reporting centers outside New York City, seasonally adjusted. In order to reduce the influence of random variables in the series, a four-quarter moving average was employed. Thus the observation labeled 51-2 represents the observed change in velocity and GNP between the four quarters ending with the second quarter of 1951 and the four quarters ending with the first quarter of 1951.

The four succeeding quarterly observations (for the periods terminating between the second quarter of 1951 and the second quarter of 1952) reveal that continued growth of GNP was accomplished with either small increases

CHANGES IN VELOCITY AND GROSS NATIONAL PRODUCT
Quarterly, 1951-56



SOURCE: Board of Governors of the Federal Reserve System and U. S. Department of Commerce.

in velocity or actual declines. This period of four quarters could be described generally as one of increasing credit demands, but without severe credit stringency. Thus the money supply continued to expand to meet higher transactions requirements.

Beginning with the third and fourth quarters of 1952, however, recorded increases in production are associated with higher velocity rates, as Federal Reserve policy was increasingly directed toward restraint of growth of the money stock. This policy of tightness continued into the second quarter of 1953, and, as recorded in the chart, still higher velocity accompanied further expansion of GNP.

As economic activity and credit demands showed signs of weakening around mid-1953, credit policy was relaxed. The four quarterly observations between mid-1953 and mid-1954 reflect these events. GNP showed a relatively small increase in the third quarter of 1953, followed by successive declines in the next four quarters. Velocity showed little change.

The last group of observations show changes in velocity during a period of credit tightening. Beginning with the latter months of 1954, business activity showed distinct signs of recovery, and the policy of credit ease on the part of the monetary authority was gradually altered in the direction of increasing restrictiveness. Again, these events are reflected in velocity movements accompanying changes in production. Expansion of GNP from the fourth quarter of 1954 through the third quarter of 1956 was accompanied by a distinct upward trend in velocity.

The changes in turnover rate described above demonstrate the need to recognize that money has a velocity as well as a quantity aspect. This is intended to emphasize the fact that decisions by the public to hold money varying lengths of time, or in other words, to hold varying quantities of money in relation to spending rates, show marked changes from one period to another. Although changes in the supply of money clearly are important in determining the level and direction of economic activity, movements in velocity are capable of either reinforcing or diminishing the effects of quantitative changes. Fruitful analysis of changes in the money supply requires recognition of the variety of motives for holding money balances, including such diverse purposes as meeting planned consumption and investment transactions, as well as unforeseeable contingencies and opportunities for advantageous purchases. Thus, the potential effects upon income and production of a given change in the quantity of money must be considered in light of the situation in which the change takes place.

Farm Efficiency and Costs

RECENT CHANGES in the level of agricultural prices have focused new attention upon the price-cost situation in agriculture. Not only has the index of prices received by farmers surpassed the level of a year earlier, but prices of many commodities throughout the economy have shown an upward trend. The outlook is for further change in prices, which will cause some increase in the cost of farm machinery and equipment and other items that farmers buy. Prices that affect the costs in agriculture may retard the recovery of agricultural income, but the relative position of the two categories of prices (prices received and prices paid) will establish the final income position of farmers.

It is almost impossible for the individual farmer, through his own action, to influence either the level of prices received or prices paid because his own actions play such a minor part in the total agricultural industry. Individually, his efforts are limited to making adjustments within the farm business to meet the current changes in prices. He is concerned not only with making adjustments in terms of what to produce, but also with how to produce it.

This article is primarily concerned with adjustments to rising farm costs that the individual farmer can make in times of depressed prices and severe drought. These adjustments in agriculture are related to the adoption of new techniques and are a major factor in establishing the relative position of agriculture in our economy.

Efficiency In Farming

The general purpose of adopting new methods of producing farm products is to make the agricultural unit more efficient. Before dealing with the relationship to costs, one must consider what is meant by improved efficiency. Efficiency is a term that has various meanings to many groups and occupations. For example, irrigation engineers measure efficiency in irrigation as the per cent of water pumped at the well which ultimately is absorbed by the soil in fields under irrigation. In more general terms, the concept of efficiency to a consumer is to produce the greatest amount of desired goods and services from the entire stock of resources of the Nation.

What does farm efficiency refer to in dealing with the broad aspect of farm operation? One way in which the farmer views his efficiency is from a purely physical standpoint. He has become more efficient if he has increased the output without using additional resources, or if he has reduced the total amount of resources used in producing the same amount of output by changing the combination of resources. If this definition is examined more closely, it becomes evident that attempting to increase efficiency is a daily task on most farms. Whenever it is possible to change the method of producing a commodity so that

it takes less material and services than it did before, then it can be said that efficiency has been increased.

An example of this type would be changing the order in which jobs are carried out. If the output could be increased simply by changing the order in which tasks are performed, the same material and services would then be producing more, or the same quantity could be produced from less material and services. On the other hand, it may be possible to use an entirely new method of production. Commodities can be produced from many different combinations of material and services. Many examples can be found in farming where different combinations of labor and capital or of protein supplements and farm grains can be used in production. Whether these new methods actually result in improved efficiency depends upon what they do to the economic value of the product and the cost of producing the product. A discussion of farm efficiency in terms of physical units takes on additional meaning to the producer when the changes in methods of production are evaluated in terms of income.

Need for Efficiency

Before any of the changes in the techniques of agricultural production can increase farm efficiency, these changes must either increase output or decrease costs. If neither of these attributes exists, a new method would seldom be adopted by the producer for financial reasons. A new technique of production that increases the output from the same set of resources would always increase the net income from producing the commodity in the immediate time period. If the same output is produced from a new combination of resources, the cost of the new set of resources must be less expensive than the old set of resources in order for the change to increase net income.

Improving efficiency in farm production has many implications in meeting rising costs. If the farmer is confronted with increases in the prices of the goods and services which he uses in production, and if prices of the commodities which he produces do not keep pace with such increases, he must find ways and means of production that are either output-increasing or cost-reducing if income is to be maintained.

The national index of prices paid by farmers for production items, which excludes the prices of items paid for living expenses, declined from a record high of 303 per cent of the 1910-14 average in May 1952, to 282 in December 1955, while the index of prices received by farmers declined from 306 to 223. Efforts have been made to cope with this situation by curtailing output and by removing resources completely or temporarily from agricultural production. Such efforts usually require general social action and are not determined by the individual farmer. The individual farmer has two major possibilities for improving his income situation by his own actions. He can (1) curtail expenditures on inputs which no longer can be justified by the lower level of prices for the resulting products, or (2) reduce costs by adopting more efficient techniques. The first is a part of the ever present decision-making process in farming. The second requires a stock of technology ready to be drawn upon to increase efficiency of farm production.

Indications of Farm Efficiency

It is difficult for the individual farmer to measure the level of his efficiency because to do so he must have detailed knowledge of individual production procedures. He must know the amount of material being used, the total volume of output, and the cost of production. Farmers are not accustomed to keeping separate records for each process. Statistics of

agricultural production are usually general and indicate the end result of many practices and procedures.

A stock of new techniques in agriculture has been created through extensive research and development during recent decades. Even though it is impossible to isolate details in the statistics of agriculture in order to analyze the effects of each new development, an examination of some of the broad effects on farming efficiency is possible. Some generalizations can be made as to what factors have caused efficiency to increase. Three livestock enterprises will be used to illustrate some effects of increased efficiency in farming. It should be emphasized that these enterprises are only a small part of the many production processes in agriculture that have been affected by improved efficiency. The data for these three enterprises tend to emphasize some of the phenomenal changes that have taken place in production methods.

The poultry enterprise has shown one of the greatest increases in efficiency among all farm enterprises during the last two decades. One broad measure of the results of more efficient production is that of the number of eggs laid annually per hen or pullet of laying age.

EGGS LAID ANNUALLY PER HEN OR PULLET OF LAYING AGE ON FARMS, 1930-55

United States

Year	No.	Year	No.
1930	121	1943	142
1931	127	1944	148
1932	121	1945	152
1933	118	1946	156
1934	118	1947	160
1935	122	1948	166
1936	121	1949	170
1937	130	1950	174
1938	135	1951	177
1939	134	1952	181
1940	134	1953	185
1941	139	1954	188
1942	142	1955	192

SOURCE: U. S. Department of Agriculture.

PIGS PER LITTER FOR SPRING AND FALL CROPS COMBINED, ANNUAL AVERAGE, 1930-54

United States

Year	No.	Year	No.
1930	6.00	1943	6.17
1931	6.04	1944	6.13
1932	5.90	1945	6.32
1933	5.88	1946	6.47
1934	5.82	1947	6.21
1935	6.02	1948	6.50
1936	6.02	1949	6.48
1937	6.24	1950	6.45
1938	6.35	1951	6.52
1939	6.19	1952	6.64
1940	6.14	1953	6.76
1941	6.39	1954	6.85
1942	6.35	1955	n. a.

n. a. Not available.
SOURCE: U. S. Department of Agriculture.

In 1930, the average hen or pullet on farms laid 121 eggs. Except for a few years in the early 1930's, the number of eggs laid per hen or pullet has shown an almost steady increase up to the present. In 1955, it had increased to 192. Total egg production in 1930 was 39.1 billion eggs, as compared to 59.5 billion in 1955. The data indicate that it took 13.9 million fewer birds to produce the 59.5 billion eggs in 1955 than the 39.1 billion in 1930. The rise in production per bird during this period has no doubt been brought about by improvements in feeds, selection, breeding, disease control, housing, and other changes in the techniques of handling the poultry enterprise. Even without appraising the inputs and returns, it might be concluded that those producers who continued to use 1930 techniques of egg production found it increasingly difficult to compete in a 1955 egg market.

The number of pigs produced per litter is a means of measuring results of changes in production techniques in the hog enterprise. Again, this is not a precise measure of efficiency, but it does indicate some results obtained from improved techniques. In 1930, the average number of pigs saved per litter was 6. By 1955, the average had increased to 6.85 pigs

per litter. The magnitude of the change in pigs per litter is not as striking as the change cited for the poultry enterprise. The change also was more erratic. However, if the 1954 average is applied to 1930 hog production, the increase becomes rather significant in the hog enterprise. If an average of 6.85 pigs per litter had been attained in 1930, the number of hogs produced would have increased by 10.5 million pigs, or by about 14 per cent. Improvement in the equipment used during the farrowing season has increased efficiency in hog production. Improvements in breeding, feeding, and selection also have occurred.

Dairying is another enterprise in which technological improvements have been significant. Average milk production per cow has increased at a very rapid rate in spite of periods of unfavorable milk-feed ratios. The average milk production per cow in the United States in 1930 was 4,508 pounds. In 1955, the level of production per cow had increased to 5,815 pounds. Since 1945, the number of milk cows on farms in the United States has declined quite substantially, but total milk production in the United States has continued to increase. Some increase in total milk production has been accomplished by increasing the amount of grain and concentrate in the ration.

AVERAGE MILK PRODUCTION PER COW ON FARMS, 1930-55
United States

Year	Pounds	Year	Pounds
1930	4,508	1943	4,598
1931	4,459	1944	4,572
1932	4,307	1945	4,787
1933	4,180	1946	4,886
1934	4,033	1947	5,007
1935	4,184	1948	5,044
1936	4,316	1949	5,272
1937	4,366	1950	5,314
1938	4,558	1951	5,333
1939	4,589	1952	5,374
1940	4,622	1953	5,542
1941	4,738	1954	5,657
1942	4,736	1955	5,815

SOURCE: U. S. Department of Agriculture.

A part of the increase also must be explained by improved feeding, breeding and selection, housing and equipment, and other dairy production practices.

What have changes in the methods of producing eggs, pork, and milk meant to the individual farm business? For many farmers, these changes have meant an increase in efficiency. They have either increased the output from the same quantity of resources or they have reduced the cost of producing the commodities. Many times such changes cause an increase in total agricultural output and if demand does not keep pace, prices may be depressed. The individual farmer strives to adopt new methods to reduce his costs and, in turn, improve his income. Generally, all farmers are not able to adopt every new method which affects the cost of producing farm products. However, when a new method has proved to be a cost-reducing technique for some farmers, it might pay the individual farmer who can make the adjustment to adopt the new technique. He would regain his relative position with other producers who had made the change earlier. This might well be inferred from the above data on poultry, hog, and dairy production. It is highly probable that many individuals who continue to use techniques that are obsolete today are finding returns lower than if they had been able to keep pace with the new developments.

Deterrents of More Efficiency

Adopting new methods of production in agriculture appears to be a necessary adjustment for individual farmers in order to maintain efficiency at a comparable level with other producers. There are, however, several reasons why farmers find it difficult to adopt all new techniques as soon as they become known, even though most farmers may adopt them at some future time. Experiment stations and private enterprise have been developing new

methods of agricultural production at a very rapid rate. Even now, the number of practices not fully adopted by agriculture seems to be quite large. For the individual farmer, this stock of new developments is fortunate because it provides the basis for further adjustments to meet the increases in the prices of materials which he uses in production. The adoption of new techniques is sometimes a slow process. However, the period of time required to introduce new techniques in agriculture might be shortened by economic forces and institutions which are at work in the economy of today.

Farmers usually do not engage in experimentation and research. Instead, this function has been left largely to public and private institutions. Farmers most frequently test the new techniques under farm conditions after they have been developed experimentally. What works on one farm frequently is not best for all farms. Some prefer to watch neighbors perform the field testing before they are willing to adopt the practice. This period of observing often causes them to forego the early benefits of the new techniques, but it also lessens the risk of loss in case the new method proves to be unsuccessful. Thus, there is an educational process involved in getting new techniques adopted in agriculture.

Adoption of new methods of production often is delayed because of the financial loss incurred in terminating the present method. Many production methods are associated with fixed investment in buildings and equipment. If the equipment is not fully depreciated or cannot be sold without loss, the depreciation costs continue even under the new method of production. Because these older fixed costs often cannot be terminated, the new production process becomes more expensive for the first few years. New methods of production generally are adopted as old buildings or equipment wear out or are depreciated fully.

Probably more important is the fact that most of the new methods introduced since 1930 have required additional capital and have been labor-saving techniques. Farmers and businessmen in agricultural areas generally express concern over the increase in the expenses incurred by farmers as compared to some earlier period. The individual farmer may be spending more than he did previously in conducting his business but he also may be producing more than he did under his old cost structure. Rather than reduce total costs in the business, the new techniques lower per unit costs and free labor resources so the individual farmer is able to expand the volume of business. The farmer, using new techniques, can produce more than he did before from the capital he formerly employed, and if he is able to secure additional capital to combine with the freed labor resources, he can increase his total production even further. The problem of taking advantage of new technology to make adjustments in the farm business often becomes one of securing additional capital in order to use the new methods of production.

The producer has two main sources of additional capital for adjusting his methods of production. It can be withdrawn from his own accumulation of funds from the business or it can be secured from sources outside the farm business. Few farmers accumulate any substantial amount of capital and hold it in liquid assets which may be used to expand or adjust the farm business when economic conditions warrant such change. More likely, farmers put capital back into the business year-by-year as income is received. In years when prices received by farmers are declining, net income from farming (which is the source of the farmer's own capital) usually declines. The source of funds for employing new techniques in the farm business usually is curtailed during periods when economic pressures requiring new adjustments are most intensive. This

source is curtailed even further during periods of extended drought conditions, such as those which have been experienced by many farmers in the Tenth Federal Reserve District in recent years. When output is curtailed by drought, income may become inadequate to meet current operating expenses and may leave no funds to be employed for adjustments to new techniques.

If income is not adequate to provide a source of capital for increasing efficiency, it may be necessary to rely entirely on sources of funds outside the farm business in order to maintain progress in farming efficiency. Farm mortgage debt and nonreal-estate debt of farmers have increased substantially since 1946. The increase in farm debt has no doubt had considerable influence in maintaining the rate of adjustments in agriculture to meet higher costs and improve efficiency. Just how much it has contributed is difficult to determine. During periods of declining income and extended drought, farmers may become more reluctant to increase indebtedness to finance investments in new methods of production.

Summary

A high level of efficiency is essential in conducting a successful business in agriculture. The introduction of more efficiency in the farm business tends to make better use of farm resources and reduces the cost of producing farm products. Technological improvements in agriculture have accounted for much of the increase in farm efficiency in recent years. Through research and development, a large stock of new technology has been made available to farmers and this has caused many changes in the cost structure of farming. In the past decade of declining income and increasing prices of goods and services used in production, these new techniques have provided a means whereby the individual farmer could make adjustments in his costs of production.

Technology is not adopted immediately by all farmers as soon as it becomes available. Some farmers are able to adopt new methods of production rapidly, while others have specific reasons for delaying the change to new methods. Generally, new techniques must be tried out and fully demonstrated before many farmers are willing to use them. Other farmers find it profitable to wait and change to new methods after present equipment is worn out or has been depreciated. When income is curtailed by drought or economic conditions, the adoption of new techniques often is postponed.

Many of the new techniques in agriculture require additional capital. Farmers must depend upon income or sources outside the farm business in securing the needed capital to make adjustments which increase farm efficiency. Financial institutions play an important role in making available to agriculture funds which can be used to incorporate new techniques.

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Agriculture

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Agricultural Outlook—1956 (7 pages)	January
Agriculture at Midyear (6 pages)	August
Bank Lending to Farmers (6 pages)	November
Development and Financing of Irrigation (7 pages)	June
Farm Efficiency and Costs (6 pages)	December
Impact of Agriculture's Changing Structure (6 pages)	April
Links in the Farm Legislation Chain (7 pages)	July
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Textile Production and Consumption (6 pages)	February

Banking and Finance

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Consumer Credit, Durable Goods, and Saving (5 pages)	September
Country Bank Management of Cash Reserves (7 pages)	August
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Economic Expansion: How Will Commercial Banks Participate? (8 pages)	September
Federal Investment Funds in the Money Market (7 pages)	November
Federal Reserve Float (6 pages)	January
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Money Supply and Velocity (6 pages)	December
Residential Mortgage Market (6 pages)	October
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Shifts in Business Use of Bank Credit—The Postwar Decade (6 pages)	May

Industry and Trade

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Business Capital Spending: Plans and Realizations (6 pages)	May
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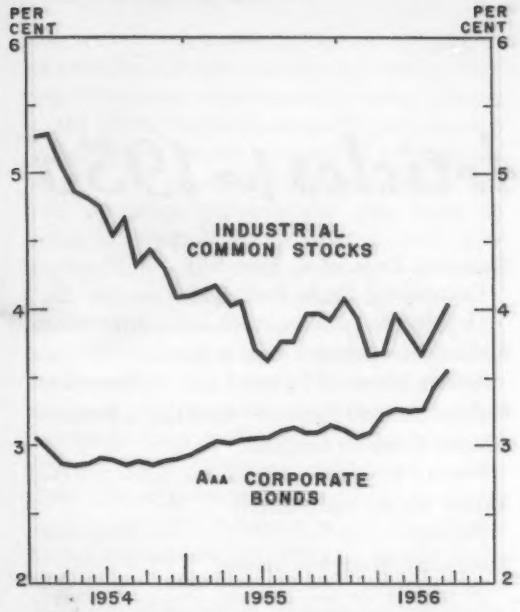
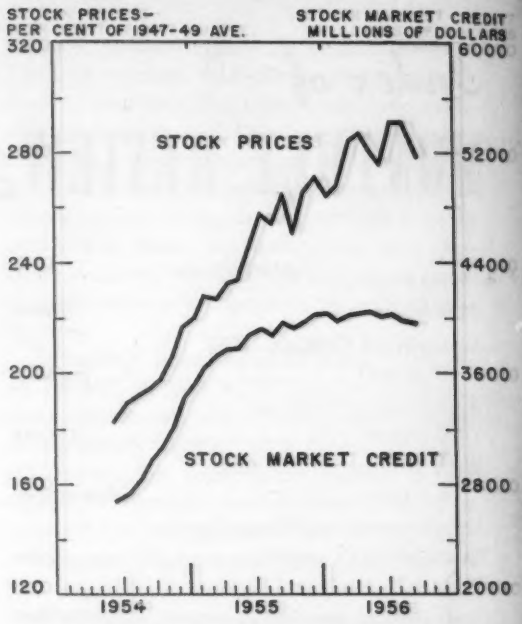
Oil Expansion in the Western District States (6 pages)	October
Recent Developments in District Employment (6 pages)	July
Residential Mortgage Market (6 pages)	October
Retail Trade in 1955 (6 pages)	March
Shifts in Business Use of Bank Credit—The Postwar Decade (6 pages)	May

YIELDS ON STOCKS AND BONDS



STOCK PRICES AND STOCK MARKET CREDIT



BANKING IN THE TENTH DISTRICT

District and States	Loans				Deposits			
	Reserve City Member Banks		Country Member Banks		Reserve City Member Banks		Country Member Banks	
	October 1956 Percentage Change From							
	Sept. 1956	Oct. 1955	Sept. 1956	Oct. 1955	Sept. 1956	Oct. 1955	Sept. 1956	Oct. 1955
Tenth F. R. Dist.	0	+6	0	+7	−1	−1	0	+2
Colorado	−1	+10	0	+1	+1	+1	−1	0
Kansas	0	+4	0	+11	−2	−4	0	+2
Missouri*	−1	+2	0	+6	−1	−2	+1	+5
Nebraska	+2	+6	0	+2	+3	−2	+2	−3
New Mexico*	**	**	−4	+9	**	**	+3	+8
Oklahoma*	0	+8	−1	+12	−5	0	−3	+6
Wyoming	**	**	−1	+9	**	**	+3	+5

*Tenth District portion only. **No reserve cities in this state.

PRICE INDEXES, UNITED STATES

Index	Oct. 1956	Sept. 1956	Oct. 1955
Consumer Price Index (1947-49=100)	117.7	117.1	114.9
Wholesale Price Index (1947-49=100)	115.5	115.5r	111.6
Prices Rec'd by Farmers (1910-14=100)	234	236	229r
Prices Paid by Farmers (1910-14=100)	287	287	280

r Revised.

TENTH DISTRICT BUSINESS INDICATORS

District and Principal Metropolitan Areas	Value of Check Payments		Value of Department Store Sales		*Value of Residential Building Permits	
	Percentage change—1956 from 1955					
	Oct.	Year to date	Oct.	Year to date	Oct.	Year to date
Tenth F. R. Dist.	+12	+6	+1	+2	+1	−27
Denver	+15	+9	−1	+6	+50	−33
Wichita	+8	−1	+10	+3	+31	−36
Kansas City	+12	+4	−8†	−3†	+13‡	−10‡
Omaha	+4	+1	−1	−3	+47	+49
Okla. City	+12	+8	+4	+5	+49	−36
Tulsa	+16	+10	+1	+4	+103	−21

*City only. †Kansas City, Mo., only. ‡Kansas City, Mo., and Kans.